NON-PUBLIC?: N
ACCESSION #: 8912270266
LICENSEE EVENT REPORT (LER)

FACILITY NAME: THREE MILE ISLAND, UNIT 1 PAGE: 1 OF 04

DOCKET NUMBER: 05000289

TITLE: HIGH RCS PRESSURE REACTOR TRIP DUE TO MAIN TURBINE EHC MALFUNCTION
EVENT DATE: 11/29/89 LER #: 89-003-00 REPORT DATE: 12/21/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: DENNIS V. HASSLER, TMI-1 LICENSING ENGINEER

TELEPHONE: (717)948-8833

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At approximately 0806 hours on November 29, 1989, a rapid reduction in turbine load occurred. This rapid reduction in load resulted in increasing temperature and pressure in the Reactor Coolant System causing the reactor to trip on high RCS pressure within about 4 seconds. The Reactor Protection System functioned correctly and operator response was appropriate. The post trip response was normal. Main steam header pressure was reduced to reseat a Main Steam Safety Valve (MS-V-21A). Level control for B OTSG was considered sluggish and the feedwater valve was controlled manually. These actions are in accordance with procedures and training.

The rapid load reduction was the result of EHC action. The power load unbalance circuit that protects the turbine from overspeed and the speed

error circuit were suspected since either of these circuits can result in rapid control valve closure. The function and calibration of these circuits were checked. Minor calibration drift was found. The drift was not abnormal and would not have caused the transient.

A loose shield wire was found on the input to the speed error circuit from the turbine primary speed sensor. It is postulated that the loose connection was disturbed by opening and closing the cabinet doors.
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was determined to be the probable cause.

END OF ABSTRACT

HIGH RCS PRESSURE REACTOR TRIP DUE
TO MAIN TURBINE EHC MALFUNCTION

I. PLANT OPERATION CONDITIONS BEFORE THE EVENT

TMI-1 was operating at 100% power. The plant was being controlled by the Integrated Control System which was in full automatic.

II. STATUS OF STRUCTURES, COMPONENTS OR SYSTEMS THAT WERE INOPERABLE AT
THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

No major equipment was inoperable. The Electrical Malfunction Light on the EHC Panel (TA/PL) in the Control Room was lit due to a failed meter relay for the 3KHz oscillator. Inspections were being performed at the EHC Cabinet to check for additional malfunctions. The inspections at the cabinet may have contributed to the event.

III. EVENT DESCRIPTION

At the time of the event the plant was oper?ting at 100% power. RPS Channel A was in Manual Bypass with surveillance testing in progress. The RPS Testing did not impact this event.

At approximately 0806 hours on November 29, 1989, a rapid reduction in turbine (TA/-) load occurred. This rapid reduction in load resulted in increasing temperature and pressure in the Reactor Coolant System (AB/-) causing the reactor (AB/RCT) to trip on high RCS pressure within about 4 seconds. The Reactor Protection System functioned correctly and operator response was appropriate. The post trip response was normal. Main steam (SB/-) header pressure was reduced to reseat a Main Steam Safety Valve (SB/RV) (MS-V-21A). Level control for B OTSG (AB/SG) was considered sluggish and the feedwater valve (SJ/V) was controlled manually. These actions are in accordance with procedures and training.

As an RPS trip, this event is reportable in accordance with 10 CFR 50.73 a.2.iv.

IV. COMPONENT FAILURE DATA

N/A

V. AUTOMATICALLY OR MANUALLY INITIATED SAFETY SYSTEM RESPONSES

The Reactor Protection System, Control Rod Trip Breakers (AA/BKR) and Control Rods (AA/ROD) all ,functioned correctly to shutdown the reactor. The Reactor Trip Containment Isolation Logic and components functioned correctly. No other safety systems were actuated.

VI. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

All safety systems performed as designed and there were no adverse safety consequences as a result of this incident.

VII. PREVIOUS EVENTS OF A SIMILAR NATURE

A reactor trip of a similar nature occurred on October 30, 1988 and was reported in LER 88-006.

VIII. CORRECTIVE ACTIONS PLANNED

Investigation indicated that the rapid load reduction was the result of EHC action. The power load unbalance circuit that protects the turbine from overspeed and the speed error circuit were suspected since either of these circuits can result in rapid control valve closure. The function and calibration of these circuits were checked. Minor calibration drift was found. This drift was not abnormal and would not have caused the transient.

A loose shield wire was found on the input to the speed error circuit from the turbine primary speed sensor. When the loose connection was disturbed, an indication of speed error was received. By simulating an 1800 RPM signal then moving the loose shield wire the valve close signal due to speed error was produced. This test indicates that the loose connection could have been the cause for the load reduction. A malfunctioning meter relay caused the Electrical Malfunction Light to be on at the Turbine Control Panel. As a result of the malfunction light being on, cabinet indication for the power supplies was being checked twice per shift to detect any additional problems. A check was performed just prior to or coincident with the trip. It is postulated that the loose connection was disturbed by opening or closing the cabinet doors.

Corrective action included checking connections in the EHC Cabinet for loose screws, verifying that the shield at the field end of the cable for the speed circuit was ungrounded and checking the field end connections for loose screws. No additional problems were found.

VIII. CORRECTIVE ACTIONS PLANNED (CONT'D.)

Another possible cause for the transient is a power supply transient. The power supplies were scheduled for replacement at the next outage with refurbished power supplies due to the spiking previously observed. No power supply alarms occurred during the event. Bench testing of the power supplies indicated a problem with one of the supplies; however, due to the redundant supply this is not considered to be the cause for the event. The power supplies were replaced prior to return to operation.

Additional EHC monitoring capability is being evaluated and noise testing of EHC is planned for the BR Outage.

NOTE: The Energy Industry Identification System (EIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in parentheses, "(SI/CFI)", where applicable, as required by 10 CFR 50.73 (b)(2)(ii)(F).

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DeceMber 21, 1989
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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station Unit I, (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
LER 89-003-00

This letter transmits Licensee Event Report (LER) No. 89-003-00 which deals with high RCS pressure reactor trip due to main turbine EHC malfunction. Public health and safety were not affected.

This LER is being submitted pursuant to 10 CFR 50.73, using the required NRC forms (attached). NRC Form 366 contains an abstract which provides a brief description of the event. For a complete understanding of the event, refer to the text of the report which appears on Form 366A.

Sincerely,

H. D. Hukill
Vice President & Director, TMI-1

HDH/DVH/spb

Attachment

cc: R. Hernan
W. Russell
F. Young

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General Public Utilities Corporation

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